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INSECTS DESTRUCTIVE TO BOOKS.[1]

(SECOND CONTRIBUTION.[2])

BY WILLIAM R. REINICK.

"The man who marks a borrowed book,
And makes the ends and corners look
Dog-eared and ragged and infirm,
He is an insect and a worm."

ELLA WHEELER WILCOX.[3]

It will be impossible in this lecture to go into details regarding the various series of experiments that have been made and studied in order to obtain the results, which I will speak of this evening, on account of the limit of time. Some of my remarks will appear to some researchers to be the words of one lacking an understanding of the groundwork of science, but in reply to those who doubt, I can only say, investigate along the same lines and the results will amply repay you for your time and labor.

Paste-eaters.—The statement previously made by me to the effect that the paste used in binding was often eaten by the larvæ of insects hatched from eggs that were originally in the flour, has been questioned on the ground that the heat necessary to boil paste, 212°, would have killed all life. How this challenge could have been made by anyone who had experimented on the vitality of eggs under adverse conditions is beyond my comprehension. They confuse the life that has hatched with the life within the egg. Heat no doubt would destroy the greater portion of the life that had hatched, but

[1] Copyrighted by the author, 1911.
[2] A lecture delivered at the University of Pennsylvania, 1911.
[3] From a manuscript in the author's collection.

not always, as in the case of certain bacteria, who from their known power to withstand a high degree of heat, are popularly called heat-lovers. They have even stood the high temperature of steam for a number of hours. But aside from the imago state of the insect, the egg, in which the embryo passes through its various stages, has been overlooked, and experiments properly conducted will prove them capable of withstanding a temperature very much above that which the scientist of to-day has knowledge.

Anyone caring to investigate the life in the paste may easily do so in the following way: Boil the flour in the usual manner, adding the glue for the binder, and after allowing the mass to cool, let it stand in a dark, damp place. After it has become sour, it will be found that nature will again produce the same forms from it as she did when it was in the form of flour. Naturally, to give conclusive evidence, care must be taken to see that no insects are allowed to gain access to the paste from the outside, so as to avoid any possibility of their laying their eggs in the substance.

Bindings: Wood Bindings.—Books that are bound with wood covers are always subject to the borings of the insects that lived on the species of trees from which the boards are made, especially if the atmosphere is saturated with moisture, this being due to the porous nature of the wood. Take the point of a needle, touch the wood, and you find that it gives, showing that it is composed of cells containing gases. They are not only subject to attacks from without, but also from within; *i.e.*, larvæ hatching from eggs that were deposited in the tree before it was made into lumber. The early stages of a number of species of wood-destroying insects take quite a long period to evolve.

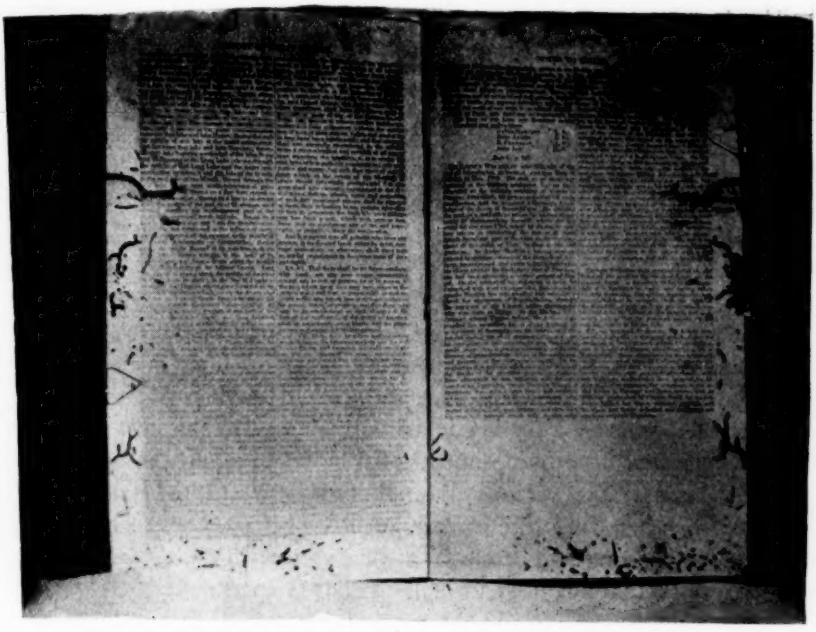
The insects destroying wood bindings are species of *Bostrychidæ* and some of the *Scolytidæ*. One species of *Cerambycidæ* has been named as causing trouble, and as a large proportion of the species of this family are wood-borers, other species will likely be found to tunnel these covers.

Bindings: Leather Bindings.—The so-called dry rot of leather bindings said to be caused by the fumes in the air, especially where gas is used for lighting purposes, is also found to take place with leather-bound books that have not been exposed to such chemicals. Investigation will prove that instead of gases being the destructive agency, minute forms of life alone are the cause.

Another subject for future research is the cause of certain round

holes, as though made by shot, often found in books bound in sheepskin. A careful examination of bindings showing these peculiar shot-like holes failed to show any galleries leading into or along the back of the books, which the *Coleoptera,* the insects named as committing these ravages, would make; and careful observation will reveal that instead of the holes being made by beetles, that a species of *Trichina,* a parasite which at present causes great losses to sheep-breeders, is the source. The skins, even after going through the

FIG. 1



Book from British Guiana. The volume is bored through by a species of *Coleoptera.*

various processes of tanning, still contain the same basic principles as in the primo state.

Bindings: Printed Cloth Bindings.—These bindings, on account of the oils and greases used in their manufacture, are subject to the ravages of those insects which have use for such substances.

Species of *Blattidæ* and *Gryllidæ* are fond of these bindings.

Printing Inks.—While investigating the various printing inks, Mr. Thomas A. Bradley, President of the Security Bank Note

Company, of Philadelphia, called my attention to the fact, that the working clothes of the employees of his company, if left hanging in a dark place for a time, were found to have been gnawed by the larva of some species of insect, and that the most striking part was, only that part of the clothing which had been stained with ink was eaten. Most inks contain one or more acids in their composition, and as they are claimed to be poisonous and therefore should kill, one would say that the parts of the goods discolored by the inks should be exempt from these attacks, instead of proving attractive. A French author writes of a book in which the insects had eaten the portion of the paper which had received the impress of the ink, showing that they were after something besides the paper, paste or binding.

To prove this, I took a piece of parchment—sheepskin and imitation—and a quantity of the finest grade of engraver's black printing ink, made a circle of ink in the centre with diagonal lines running from this to the corners and sides and a one-eighth inch border all around the edges. After the ink was dry, I placed a piece of each kind of parchment in a tin can with twelve roaches, adding water from time to time for drinking purposes. At the end of two weeks an examination of the parchment showed that the roaches had eaten all of the edges, had then followed the diagonal lines, eating mostly the portions so marked, and then the circle, showing that they knew the value to them of the acetic acid which was in the ink.

I hope that other experiments will be made along the same lines to ascertain if the various dyes, though often of the same color, are more secure from the inroads of insects than others, on account of containing certain chemicals in their composition. *Blatta orientalis* was the species used in making these experiments.

CONDITIONS FAVORABLE FOR THE PROPAGATION OF BOOK PESTS.

Darkness.—The majority of libraries generally keep a large number of their books upon stacks placed in a dark portion of the building, badly ventilated, and the only light available as a rule is from gas jets or incandescent lamps, which are only lighted when needed. This darkness (the necessary condition for the starting of all life), the more or less damp air which is found in these surroundings, the gases of various kinds in the air, and the fact that the books most seldom called for are kept in these locations, all combine to give

favorable conditions for the propagation of these small forms of life without much chance of their being disturbed during the evolution of their life-cycle.

Gases.—It is known that quite an amount of poisonous gas is given off by the gas used for lighting purposes, and also from the breath of readers, and that if the room is not properly ventilated, a quantity is constantly floating in the air. As plant life is known to live upon this gas, so will the lower forms of life be found to exist to a greater or less degree upon them.

In the earlier stages of the earth's history, when the chaotic conditions were in full play and harmony, every form of life was crude and drawn to the grosser matter that surrounded it for its energies and principles of growth. From the sun emanates the rays that have acted on the earth's surface and its interior, generating various elements known to science to-day to the extent of some seventy elements. By the action of these heat rays in associating the waters of the earth with these elements were generated gases, and these gases are the energies upon which the lower organic life live.

Man's body is a laboratory of life. While man uses intelligence in regards to poisons, the instinctive power of the little insect is used with greater care. Doctors will prescribe poisons and the patients take them without question, but the little insect uses its instinct to know what not to touch, and of those that it does partake, knows just how much to eat.

UNFAVORABLE CONDITIONS FOR THE INCREASE OF THESE INSECTS.

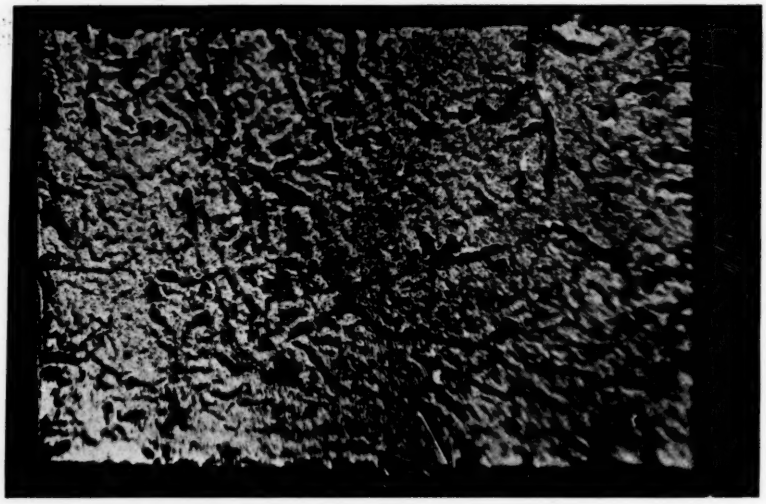
Light.—This, with cleanliness, are the two most important factors in preventing the ravages of insects among books, and will also prevent another sort of damage to books, which is the various kinds of fungi which start to grow upon and in the books a short time after they have been placed in a damp, warm atmosphere.

The lessening of the destruction of books by insects, that have been kept on shelves in badly-ventilated and badly-lighted libraries, after having been transferred to a new building having good ventilation and light, is ably illustrated by the experience of Mr. Ernest J. Reed, Librarian of the Oahu College, Honolulu, Territory of Hawaii. He stated in a letter to me that before the books were moved to the new building, the whole collection was constantly being riddled by various species of boring insects, but that since

moving to the new quarters they are comparatively little troubled by pests. From an examination of samples of books I have received from him, I wonder how anyone was able to read the books with any degree of satisfaction, as many had hundreds of tunnels running through them, some had large cavities eaten in them, and others looked as though a mischievous boy had taken a pair of scissors and tried to see how many strips he could cut each leaf into; in others the cloth binding was almost entirely eaten off, exposing the galleries made by the beetles in the cardboard covers. (Illustrations Nos. 1 and 2.)

Books will also be found to have forms of life living upon them which at present cause much speculation as to what substance they feed upon, and the insects commonly known as book-lice, belonging

FIG. 2



Volume from the Hawiian Islands. The cloth cover is almost entirely eaten, exposing in the strawboard the tunnels of *Catorama Mexicana*, a species of *Colecptera*.

to the family *Psocides* of the order *Corrodentia*, are examples. In turning over the pages of books or looking over papers which have been kept in a dark location for a long while, one with a keen eyesight will often see little specks of life run to a crevice to hide or get away from the rays of light. On account of their whitish gray color and an ability to run with a speed which is amazing when the

size of the insect is considered, it is only the keen observer who will spy them as they scamper across the printed page. Though so small, they will be found to be the cause of a great deal of damage to books.

Many investigators think that the greatest damage is committed by the larger forms, whereas, as a rule, the smaller species, in proportion to their size, consume many times the amount of food as compared to that of the larger insect. I especially noticed this in making the experiment on artificial parchment herein mentioned, where twelve roaches, many of them females, big with eggs, at which time, of course, in order to provide the necessary supply of food for the coming generation, they would eat more than before the period of gestation, ate such a small amount of the paper that I spoke about it to a gentleman who was present when I examined the parchment. A fly in one day will consume food equal to its own weight. This is also illustrated by birds, who, in proportion to man, eat a far greater quantity of food.

Researches.—During the past year, I have made a number of experiments, and much against my will have arrived at the conclusion that as far as our present knowledge of the effects of poisons on these small forms of life is concerned, we have not even laid the foundation upon which to build.

The potato bug is an example. The paris green is placed on the plant in the morning, but at night the bugs are still there and seem to be eating the plant with more voracity than when it was absent. The chemical elements in the air and plant cause a reaction to take place, by which the poisonous qualities are lost, and instead of poison to kill, a substance to the liking of the insect is produced, as I discovered during my experience in farming.

Another source of error is the lack of positive knowledge as to the resistance of these minute forms to poisons, heat, pressure, etc., in their early stages. I have been taken to task for the statement made by me in my first paper as to mosquitoes hatching from eggs that have lain exposed for a long period of time, but I think that the following example of life remaining dormant under adverse conditions is more wonderful.

When I started to collect insects, I used for a cabinet a case of drawers which had been kept in a dry room of my home and had been in daily use for about twelve years, and placed it in an outside shed, the atmosphere of which was warm and damp. Some time

after, upon looking at the contents of one of the drawers, I discovered a specimen of a large species of *Cerambycidæ* lying on the bottom and wondered where it came from. After searching on the outside and finding no opening, I pulled the drawer entirely out and discovered that the insect had emerged from the board used in making the side of the drawer, showing that while the case remained in a dry location, the life remained dormant, going on with its life cycle when the proper conditions were given.

Seeds stored in a dry location for quite long periods have been known to produce plants when placed in the soil, and anyone familiar with bacteriology knows the great vitality of these forms, invisible to the naked eye. The smaller forms also have bodies more capable of withstanding supposed remedies than the larger insects. Take one hundred roaches and the same number of red ants, pour boiling water on them, count the number of survivors of each kind, and you will find that all or mostly all of the roaches will have been killed, while a large proportion of the ants are still alive; an interesting line of experimentation for economic entomologists.

Remedies.—I have received letters from almost every country of the world suggesting remedies, some claiming success, but the majority acknowledging defeat; in many cases what was proclaimed to be a specific remedy by one writer was declared to be a failure by others.

Even books, treated with the strongest poisons, failed to give the desired results, but on the contrary the remedies seemed to give the insects that they were supposed to kill a new lease of life. In the case of experiments conducted by the United States Bureau of Standards,[4] and also by myself, the roaches (the insects experimented with) produced their young as though nothing unusual was taking place. The roach, although said to have a wonderful instinct, really has less than the smaller forms of insect life. A famous remedy for destroying roaches is made of a combination of sulphur and sugar, the sulphur causing a luminosity when the bait is placed in the dark. The roach is attracted by the glow that deadens its instinct which would otherwise warn it against the poison, and it eats the bait; but the little ant's instinct, not being

[4] Memoranda relative to binding of publications for distribution to state and territorial libraries and designated depositories.—United States Congress, Washington, 1908.

affected by the light given off by the sulphur, warns it of the danger, and as a consequence it seldom eats a poison that is placed near its haunts. This Bureau made a very large series of experiments in order to obtain, if possible, a binding material which would be exempt from the inroads of insects, and also to withstand the effects of light and gases without fading, and which Prof. S. W. Stratton, the Director of the Bureau, very kindly loaned me for study. The tests were made with cloths, ducks and buckrams of various colors. A portion of each piece was chemically analyzed in order to find what substances were used in their manufacture, and the rest of each sample was exposed to the roaches for various numbers of days. The results, when tabulated, proved that it did not seem to make any difference as to what materials were used in the coating, many of which were poisonous, as they had nibbled all but one of the bindings. They then tried impregnating some of the samples with a weak solution of quinine and others with strychnine, but these failed to give the desired immunity; and, upon increasing the quantity of the poison in the solution, the attractiveness of the substances was increased. Even corrosive sublimate was ineffective. It is true that the insects died within a few days, but not until they had ruined the bindings. One sample, seeming to be exempt from their ravages, was selected and adopted by the Bureau as a standard for binding the United States Congressional documents, and also accepted by the American Library Association Committee on Book-Binding as the best binding for library books.

During a conversation in the Government Printing Office last winter, while being shown the various materials used for binding Government documents, I expressed doubts as to the buckram approved, known as No. 666, being insect-proof; and this opinion has since been confirmed by experiments made by the Philippine Bureau of Science, Dr. Stratton and myself.

My own experiments with a poison of an entirely different character gave better results. One-half of each of the various kinds of binding materials tested was treated with my preparation and the other half left untouched. They were placed in boxes and exposed to the attacks of the roaches for various periods. Upon examination, I found that while the coloring matter in certain samples had been eaten on both the treated and untreated portions, the poisoned portions of quite a number of the others were left alone. In some cases pieces of the same color, although of different

manufacture as regards to one sample, were eaten and the other piece was left undisturbed. The remedy used by me did not, to my knowledge, kill any of the insects. From a comparison of the results, I arrived at the conclusion that the material used for coating the buckrams, etc., in a number of cases, had neutralized the effective action of the preparation used by me, and that in order to really obtain a material that would be insect-proof, it would be necessary to use such coloring matters as would not overcome the beneficial action of the poisons.

The fact that insects seem to show preference for certain colors used in binding materials, has already been noticed by a few of my correspondents; and also by myself while making researches in Florida last summer.

The Philippine Bureau of Science, finding that the buckram used as a standard was not insect-proof in the Islands, made another series of experiments, and have produced material which they claim is absolutely safe, but as I have not received any samples to test, although I have made request for same, I am unable to pass judgment upon it.

Although scientists have been experimenting upon binding materials in order to obtain one that would be exempt from the ravages of these little insects, little has been done towards preserving the most important part, and which, according to my investigations, receives the greatest injury, namely, the printed portion of the book. Some experiments made by J. Rodway, Esq., Secretary of the Royal Agricultural and Commercial Society of British Guiana, with papers impregnated with sulphate of copper, turpentine, kerosene and corrosive sublimate, failed to stop the borings of the insects. I have sent boards and books made of different papers which I have treated with a substance to Mr. Rodway, and to other parts of the world, and the results as to the effectiveness of the remedy used should be received during the coming winter.

Arsenic in its various forms is used in large quantities in the materials used in book-making, though denied by the manufacturers; but chemical analysis will generally show the presence of this substance, which is of use to the insects. The elimination of arsenic in materials used in book-making would not only do away with a source of attraction to the insects, but save people from being poisoned, as anyone familiar with the literature of poisons knows.

Books as Disease Carriers.—Again, I speak upon the transmission of diseases by books, because the greatest disease carrier among insects that we know of to-day is the common house-fly, *Musca domestica,* which is also one of the book-destroying insects. There are a number of instances where the maggots of the fly have been found living upon paper, kept in damp places, but the damage done directly to the book is as nothing when compared to the damage done by their transferring germs, and, unless means are taken for their extermination, they will rank first among book enemies, because those who know of the fly's ability to carry disease germs, will refuse to read any book which the fly has stained. The common house-fly is only found around the habitation of man, showing that it has evolved from some other form which formerly lived in the open until it has now become thoroughly domesticated, as other forms have done, are doing, and will do in the future.

According to Dr. Howard, a single female fly in the spring might, therefore, become the progenitor of 195,312,500,000,000,000 flies by the end of the summer or mid-autumn, and allowing one million flies to a bushel makes over 193 million bushels, each one of whom is capable of spreading contagion. An investigation made at the Agricultural Experiment Station at Storrs, Connecticut, in 1908, upon 414 flies, showed that the number of bacteria on a single fly may range all the way from 550 to 6,600,000, an average of one and one-fourth millions bacteria on each, an almost incredible number to be found on such a small object. The objectionable class, coli-aërogenes type, was two and one-half times as abundant as the favorable acid type. Now this only includes those on the outside, and every bacteriologist knows that large numbers are found in the intestines and expelled with the excreta. Mr. N. A. Cobb, in his article "The House-Fly,"[5] states that a well-fed fly defecates 104 times in less than two hours, and that spores were found in fifty-five of the specks. These specks, containing germs, are laid upon the covers or pages of the books, and as personal observation shows that a very large portion of readers moisten their fingers in turning over the leaves of a book, it is readily seen how the fly speck upon the paper is moistened, adheres to the finger and the germs transplanted to the mouth, where they at once find the proper conditions and proceed to breed, resulting in the reader becoming afflicted with

[5] *National Geographic Magazine,* vol. xxi, 1910, pp. 371–380.

the disease, the source of which it is impossible to trace, on account of the slight consideration given by the medical world at the present time to books as a source of disease.

The danger of contracting disease by the fingers dampened with saliva in order to turn over the pages of a book is especially so in the case of persons suffering from tuberculosis, whose sputum contains millions of the bacilli. The saliva drying, the *Tubercle bacillus* cling to the fibre of the paper, and soon as another person, who also has the vulgar habit of wetting the fingers in turning the pages, uses the book, the germs are removed to fertile soil. Many other diseases, especially skin diseases, are without doubt frequently transmitted by this means.

In conclusion, I cannot speak strongly enough on the importance of cleanliness in preventing the destruction of books by insects, and the spreading of disease. The volumes in the library should be kept thoroughly cleaned, the attendants ought to clean their hands frequently, and the patrons compelled to wash their hands before using the publications and should not be allowed to wet the fingers in turning the pages. These precautions will help to decrease the spread of tuberculosis and other diseases, and do away with the grease stains on the paper, which are breeding grounds for germs and attractive feeding places for insects. Screens should be placed on all windows and doors to prevent the entrance of flies, and by these means only will the destruction of the stores of accumulated knowledge be decreased and a source of death be overcome.

Theory Confirmed.—As this article goes to press, I have just obtained results from an experiment which goes to prove that books may be damaged by the hatching of life from eggs which were originally in the flour, or most likely, the grain.

In June, 1910, I obtained from Mr. James Stone, of Philadelphia, three samples of flour which he claimed were absolutely pure and each of the three varieties were placed in a sealed Mason jar and the jars put upon a shelf in a closet. They were thus kept in a dark location and also a dry atmosphere. At various times these jars were examined, but no sign of life appeared until the examination made October 6, 1911, at which time I was very astonished to find that two of the samples, "spring wheat flour" and "rye flour," were literally covered with what appears by looking through the glass of the jars to be a species of *Psocidæ* or book-lice. The third

sample, "winter wheat straight," does not show any signs of life at the present time.

The results are quite startling, as it shows that the stages of some of these small forms take a period of time to evolve beyond our present knowledge, also that they did not need any oxygen to sustain them as the jars have never been opened since the flour has been placed in them, showing that the assertion made above, that many small forms live to a more or less extent upon gases supposed to be poisonous, had a foundation of truth. Lastly, that instead of one of the species known as grain-eaters appearing, that a species of *Psocidæ*, the habits of which are very little known, but I do not recollect that they have ever been classed as flour-eaters before, should appear in such immense numbers.

NOTE.—This article concludes the general outline of the divisions used by me, and I shall later publish a detailed account of each, giving descriptions and illustrations of the insects and examples of their work.

THE ASSAY OF JALAP.

BY HORACE NORTH

Analyst with Lehn & Fink, New York.

Resin of jalap is defined as that portion of the drug soluble in alcohol and insoluble in water. The assay of jalap for resin is properly based on this definition.

Put 10 gms. of finely powdered jalap in a shallow porcelain basin having a diameter of about 16 cm., moisten the drug with 3 c.c. of water, granulate uniformly with the aid of a small glass pestle, transfer to a sheet of paper and thence into a 300 c.c. Erlenmeyer flask. Add 51 c.c. of 95 per cent. alcohol, connect the flask with a reflux condenser and heat in a water-bath so that the alcohol boils gently for about one hour. Lay a pledget of absorbent cotton in the bottom of a slightly conical percolator, saturate with alcohol, and press a perforated porcelain plate firmly down upon the cotton until the excess of alcohol has drained. Place the dish in which the drug was granulated on a water-bath, kept warm over a low flame, and support the percolator above the dish. Remove the flask from the water-bath, cover with a porcelain

lid and allow to cool somewhat. Pour the mixture of drug and extract into the percolator, leaving the flask in the top to drain. When the alcoholic filtrate has become somewhat concentrated, mix the drug remaining in the flask with 10 c.c. of 95 per cent. alcohol and pour the mixture into the percolator, draining the flask as before. Repeat the washing of the flask and the marc in the same manner until a portion of the percolate fails to show any opalescence on largely diluting with water. Concentrate the liquid at a gentle heat to a volume of about 10 c.c., remove the dish from the bath, and add water, a few drops at a time, to the warm extract, stirring with a glass rod, until the gum deposited by the concentrated, strongly alcoholic solution is redissolved and a clear, or nearly clear, fluid is obtained. Continue to add water in small portions, stirring thoroughly after each addition, up to a total quantity of 60 c.c., when the resin will have separated completely and may be collected in a mass under the aqueous solution, which should be quite clear. Put the dish on a boiling water-bath and heat with frequent stirring until the volume of liquid is reduced about one-third and the odor of alcohol has disappeared. Remove the dish from the bath, stir the liquid slowly so that the resin will collect, drawing any particles floating on the surface to one side, and decant the solution through a small filter. Cover the resin with 25 c.c. of water, return the dish to the bath, and, while the resin is hot and stringy, mix it thoroughly with the water. Remove from the bath, collect the resin as before, and decant the water through the filter. In like manner wash the resin a second time with 25 c.c. of water. Wash the edge of the filter with a little warm water and reject the several aqueous filtrates, first noting whether they are clear or, at most, show only that faint opalescence peculiar to solutions of gums. By means of a fine stream of hot alcohol from a wash-bottle, rinse the water remaining in the filter, together with any traces of resin, into the dish, then wash down the sides of the latter, finally warming and stirring until the resin is redissolved. Pour the alcoholic solution through the filter into a tared Erlenmeyer flask, wash the dish and filter carefully with hot alcohol, evaporate the solvent, and dry the resin to constant weight in a water-oven.

NOTES.—(1) The complete extraction of the cell-contents of a drug depends on the permeation by the solvent of every cell;

hence the necessity of first reducing the drug to a fine powder. If the sample of jalap consists of tubers, these are crushed in an iron mortar, then ground in a mill until the material passes through a No. 30 sieve, and finally pulverized by turning for several hours in a pebble mill.

(2) If strong alcohol is added directly to a finely powdered drug, the particles contract to such a degree that the menstruum percolates but slowly, if at all. When the powder is moistened with water as described above, it swells to nearly twice its original volume, the particles coalesce to form tiny granules which persist even after the addition of alcohol and heating, and the subsequent draining and washing of the drug in the percolator proceeds with great rapidity.

(3) The proportions of alcohol and water employed for the hot maceration are such as to produce a menstruum containing about 90 per cent. absolute alcohol, which appears to be a more efficient solvent than an alcohol of higher percentage.

(4) A pestle is easily made by heating the end of a glass rod 12 mm. in diameter quite hot, pressing firmly against a flat metal surface, then smoothing and rounding on a stone.

THE ASSAY PROCESSES OF THE U.S.P.[1]

By A. R. L. Dohme and H. Engelhardt.

On various occasions we have pointed out that several assay processes of the present U.S.P. are very much in need of being thoroughly revised, both because the methods are rather cumbersome, and the results are far from giving the true percentage of the active principle. Since the methods are going to be thoroughly discussed at the coming meeting of the A.Ph.A. we thought it necessary to again give our views in regard to the processes, although several points given here may have been discussed by us on previous occasions.

We still believe that the aliquot part method, when worked with precaution, gives more accurate results than the percolation method. The drug is more thoroughly exhausted by shaking with the men-

[1] Read at the Boston meeting of the American Pharmaceutical Association, August, 1911.

struum than by percolating. A percolator is perhaps our most unscientific piece of apparatus. A channel might be formed in the packed drug, the parts adjoining this channel may be exhausted, while other parts of the drug come in contact with the menstruum only superficially. The method, besides that, is very tedious, especially when such a fine powder (No. 60) as prescribed by the U.S.P. is employed, and also requires a larger amount of menstruum for the exhaustion.

We, therefore, strongly recommend the adoption of the aliquot part method, having proven by numerous experiments that the results by this method compare favorably with those obtained by exhausting the drug completely by percolation.

For the final shaking out of the alkaloids, we recommend to use, whenever possible, simple menstrua, viz., ether or chloroform and not mixtures of both in various proportions. As a rule, simple menstrua are less liable to produce emulsions than mixtures, and the menstrua are more easily recovered for future use than mixtures, which always require tiresome adjusting.

For the extraction of the drugs, however, a mixture of ether-chloroform is to be preferred. Such a mixture seems to penetrate the cell-walls better than a simple menstruum, and consequently to extract the alkaloids more thoroughly. It is to be recommended to allow the drug to stand with the menstruum for at least one-quarter hour before adding the ammonia, as the results obtained by doing so are somewhat higher, in our opinion, than those obtained by adding ether-chloroform and ammonia to the drug together at once.

Whenever possible the alkaloids should be estimated by titration; only, in some cases when hydrolysis is liable to take place, as in aconite, coca leaves, etc., a check by gravimetric estimation might be of advantage.

Of all the indicators for alkaloids, we have found cochineal to be the best, since only in titrating the alkaloids of ipecac is any difficulty experienced with this indicator. Iodéosin, at present used in the U.S.P., is rather unreliable since the aqueous liquid is not always colored red when the end point is reached, but at times a red scum is formed at the contact of the two layers, the color of this scum increasing in intensity with the addition of the alkali. It is difficult to judge, in case this happens, when the end point is reached.

In regard to the various drugs and the galenical preparations thereof, we beg to offer the following suggestions:

Aconite Root.—To avoid hydrolysis as much as possible, ammonia might be replaced by sodium carbonate or bicarbonate solution. The present process is very tiresome; only in the case of a larger dilution can a somewhat rapid filtration be effected. Keller's aliquot part process, using ether-chloroform and sodium bicarbonate for extracting the drug, and ether alone for the final extraction of the alkaloid, after having made the acid solution alkaline with sodium bicarbonate, gives very good results. The wording, "not less than 0.5 per cent. of aconitine," should be replaced by "not less than 0.5 per cent. of ether soluble alkaloids," since the residue, although it consists for the greatest part of true aconitine, is always contaminated with other basic substances. The Squibb's test has been found to be too much dependent on individuality.

Extract Aconite.—No matter how carefully this extract is prepared, a deterioration of the alkaloids is liable to take place, and the physiological strength consequently is largely reduced. Extract aconite should never be prepared. In assaying extract of aconite, the following simple process gives rather accurate results: Dissolve the extract (2 grams) in 10 c.c. of dilute alcohol, transfer the solution to a separator, make alkaline with sodium bicarbonate solution and shake out with several portions of ether. From the ethereal solution the alkaloids are extracted by shaking with several portions of acidulated water, and from the latter, after making alkaline with sodium bicarbonate, the alkaloids are removed by shaking with several portions of ether. From the etheral solutions, after filtering to remove any suspended bicarbonate, the ether is distilled off, etc.

Fluidextact Aconite.—Ten c.c. are transferred to a separator, made alkaline with sodium bicarbonate, and then assayed as just given.

Tincture Aconite.—One hundred c.c. of the tincture are evaporated at a temperature not exceeding 60° C., the residue taken up in 10 c.c. of dilute alcohol, and this solution assayed as given under extract.

Aqua Hydrogenii Dioxidi.—The method for determining the acidity should be revised. By evaporating 25 c.c. of hydrogen peroxide solution to 10 c.c. in the presence of 5 c.c. of N/10 potassium hydroxide solution, not all the hydrogen peroxide is destroyed.

This can be effected only by evaporating the solution in a platinum dish or by adding a suitable catalyzer, such as platinum black, etc.

Asafœtida.—Owing to the scarcity of this article, it would be advisable to decrease the percentage of alcohol soluble matter, and to increase the allowable percentage of ash.

Aspidium.—The activity of this drug depends almost entirely on those substances present in what is generally termed "crude filicin." A reliable method has been worked out for determining crude filicin. The macroscopic requirements given in the present U.S.P. will be met by a physiologically inactive drug also.

Belladonna Root and Leaves.—The assay process adopted for the new U.S.P., viz., the aliquot part method, has a decided advantage over the present process, and gives very satisfactory results.

Fluidextract and Extract of Belladonna.—The assay processes for these preparations are satisfactory. It is, however, advisable to increase the amounts of both the immiscible solvents and the acidulated water.

Cantharis and Its Preparations.—These should be assayed. Several reliable methods have recently been published. A suitable menstruum for preparing the tincture should also be looked for, as by the present menstruum only about 50 per cent. of the cantharidin is extracted from the drug when used in the proportion 1 : 1.

Capsicum.—We have met with several specimens of inferior capsicum. Why not give and estimate the percentage of oleoresin?

Cinchona.—For the U.S.P. IX, unfortunately, an assay process has been proposed, which is similar to the one now official, differing from it only by the larger amount of menstruum taken for extracting the alkaloids from the drug. Although this is a step in the right direction, we doubt very much whether the increased quantity of menstruum will hold in solution the alkaloids from high-grade drugs. The Fromme process, depending on the breaking up of the cells by the use of hydrochloric acid, has always given us satisfactory results. It is a short one, and a determination can easily be carried out in two hours. That such a process is of great importance to chemists who have to make a dozen or more cinchona assays at the same time (as in our laboratory, when numerous samples for purchasing the drug are submitted) is obvious. We wish to mention again that the alkaloidal residue should be dried at a temperature not exceeding 60° to 70° C., as otherwise it is strongly discolored. Any traces of chloroform should be driven

off by treating the residue twice or three times with ether. In our laboratory, we invariably control the gravimetric results by titration, because the alkaloidal residue very frequently includes waxy and other substances, which naturally increase the weight. The titration when carried out strictly according to Panchaud's direction, is not at all difficult.

Coca.—Here also the percolation process should be abandoned in the assay method. Keller's method, using plain ether, gives very satisfactory results. In case emulsions occur, which frequently takes place on account of the large amount of mucilaginous matter in the drug, tragacanth should be used for breaking up the emulsions.

Cochineal.—It is advisable to include in the U.S.P. a determination of the color strength of the drug, also an estimation of the moisture.

Colchicum Seed and Corm.—We have pointed out on various occasions that the results obtained by the present assay methods are absolutely wrong, that the residue calculated as colchicine contains only about 50 per cent. of the alkaloid. The assay processes should be thoroughly revised. Dr. A. B. Lyons has given valuable information in what way these processes could be improved. For the estimation of pure colchicine in the alkaloidal residue, several methods are available also. We do not care to go into details about these improvements, since we have given a compilation of them some time ago.

Conium Seed.—The assay method for this drug also should be revised. It is very cumbersome and could easily be replaced by a more expeditious process.

Conium Leaves.—This drug, although not official, should never be used. All the samples submitted to this laboratory for examination were almost void of coniine.

Cubebs.—An estimation of and requirements for the percentage of oleoresin should be given. Cubebs vary considerably in the amount of oleoresin.

Emplastrum Belladonnæ.—A few slight modifications of this assay process have recently been recommended. The process, however, we find works very well.

Ergot.—On various occasions we have mentioned a simple process to estimate the approximate amount of cornutine present in the drug. If it can be proven beyond doubt that the percentage of cornutine is in proportion to the physiological activity, this test should be adopted for the U.S.P.

Ferrum Reductum.—The assay process could be improved on.

Gelsemium and Its Preparations.—Assay processes for these substances have been recommended on various occasions. We believe, however, that such a process is only of relative value as long as the proportion of the active substance to the inactive is not known in the residue determined as total alkaloids. Quite recently a good deal of light has been thrown on the constituents of gelsemium and possibly in the near future an assay process based on the estimation of the active principle alone will be worked out.

Glandulæ Suprarenales et Thyroideæ.—Colorimetric or chemical estimation of the active principles is desirable.

Granatum.—The total alkaloids in pomegranate bark can easily be estimated.

Guarana and Its Preparations.—The assay processes are good.

Hydrastis and Its Preparations.—The amount of golden seal taken for the assay is entirely too large considering the high percentage of hydrastine in the drug. There is no reason why the assay of the fluidextract should not be based on the same principle as the assay of the drug.

Hyoscyamus and Its Preparations.—All that is said about Belladonna applies to these products also.

Ipecacuanha and Its Preparations.—The amount of drug prescribed for the assay process should be reduced considerably, say to about 6 grams. The assay process otherwise is satisfactory. We have pointed out above that the titration of the alkaloidal residue is somewhat difficult, and it would be desirable to try other indicators which might prove to be more satisfactory.

Jalap.—A shorter process depending on the exhaustion of the root with hot alcohol and taking, after cooling and readjusting the weight, an aliquot part has been recommended by us on a former occasion. In connection with this drug it may be said that the quality of the various samples and shipments during the last twelve months was superior to that in previous years. Would it not be advisable to control the galenical preparations of jalap by simple assay processes?

Kola and Its Preparations.—These should be assayed by a process similar to that given for guarana. To estimate the amount of theobromine, acid instead of water has to be used for extracting the alkaloids from the chloroformic solution.

Maltum and Extractum Malti.—It is advisable to give assay

processes for the determination of maltose and diastatic power. We have met with numerous samples of malt which were deficient in both respects.

Nux Vomica and Its Preparations.—Keller's aliquot part method, using ether and chloroform, gives fairly good results; it must, however, be admitted that the results obtained by using the U.S.P. menstruum are slightly higher. The amount of powdered drug can be reduced on account of the high percentage of alkaloids in the drug. It is to be regretted that the U.S.P. IX again shall adopt a method for determining the strychnine. The present official method and the numerous modifications thereof give fairly accurate results only in the hands of experienced workers. We doubt very much that the variation of the proportion of strychnine and brucine in the drug is greater than the variation obtained by assaying the same drug by various chemists. Only such methods should be adopted in the U.S.P. which are simple and give fairly accurate results, and not such ones which require much ability and experience. The U.S.P. is not written for experienced chemists, such as are generally found in the laboratories of the large wholesale houses, but for the retail pharmacist also, who very seldom has and will have a thorough experience in assaying drugs. We have mentioned on other occasions that of all the pharmacopœias only the English directs the strychnine to be estimated, and this is done by a method which is still inferior to the old Gerock method and its modifications. We are afraid that by adopting the strychnine determination much trouble and numerous litigations will be caused. If it is important to determine the strychnine alone, why has not a process for doing so been adopted by the Swiss, German, etc., pharmacopœias, which without doubt are up-to-date works? Is brucine therapeutically absolutely inert, and can it be entirely neglected? In our opinion, the determination of the total alkaloids (which by no means is such a very simple one, on account of the ammonia bases and the soap which are liable to be formed during the assay process) is a better criterion for the quality of the drug, than an unreliable and incorrect estimation of the strychnine alone.

Extract Nucis Vomicæ.—The easiest way of assaying this extract is to convert the extract into a fluidextract by dissolving in diluted alcohol, rendering the solution alkaline with ammonia water, shaking out with several portions of chloroform, etc.

Fluidextractum and Tinctura Nucis Vomicæ.—Evaporate the

quantity prescribed for the assay to dryness, take up residue in dilute alcohol, and proceed as just given.

Opium.—In regard to this drug, we wish to refer to an article submitted to the A.Ph.A. (Proc. A.Ph.A., 1910, page 829) a year ago. There is no doubt that by the present official process almost the entire morphine contained in the drug is obtained, although Debourdeaux, *Journ. de Pharm. et Chem.*, vii, iv, 68, claims that by further exhaustion with water, still more morphine can be exhausted. He also claims that if the crude morphine, as obtained by the U.S.P. process, is not washed thoroughly, lime-water soluble substances are determined as morphine, rendering the percentage of the latter too high. We have obtained very good results with the present method; we think, however, that a shortening of the process would be desirable.

Extract Opium and Tincture Opium.—The assay methods work satisfactorily.

Pancreatin.—For the assay process the use of potato starch should be recommended. The milk test is unreliable and should be deleted.

Pepsin.—We have at times experienced considerable trouble with the assay process, which apparently was due to the age of the eggs. Recently we have only used eggs from 5 to 10 days old, and have obtained with such material rather concordant results. At the Indianapolis meeting of the Am. Chem. Soc. a paper will be read dealing with the use of dry egg albumin in the assay process of pepsin. If the results obtained by using dry albumin are encouraging, this modification should certainly be tried by the Revision Committee. Dry albumin can more easily be obtained in a uniform quality than fresh albumin, which contains a varying amount of water, according to the age of the eggs.

Physostigma and Its Preparations.—Slight modifications as to the quantities of immiscible solvent and acidulated water should be made.

Extractum Physostigmatis.—The use of sand and evaporation to dryness are to be avoided. We prefer to use powdered glass and to evaporate the liquid until the alcohol is expelled. Such a moist mass can be transferred to a bottle much easier than the hard mass obtained by the official process. Results just as accurate can be obtained by converting the solid extract into a fluidextract by dis-

solving it in dilute alcohol, rendering alkaline with sodium bicarbonate, shaking out with ether, etc.

Fluidextractum and Tinctura Physostigmatis.—The modifications just mentioned apply to the assay of these preparations also.

Pilocarpus and Its Preparations.—Replace the percolation process in the assay method by the aliquot part method. In case emulsions should be formed, use tragacanth for breaking up emulsions.

Fluidextractum and Extractum Pilocarpi.—The modifications suggested under physostigma apply to the assay processes of these preparations also. Fluidextract of Pilocarpus can be assayed by shaking out directly with chloroform after making alkaline with ammonia. Emulsions which are liable to be formed can be avoided by using a large amount of chloroform.

Piper.—The percentage of oleoresin should be determined.

Podophyllum.—Mandrake with less than 4 or 4.5 per cent. of resin is frequently met with on the market. An assay process for this drug therefore seems necessary.

Fluidextractum Podophylli.—The percentage of podophyllin should be determined.

Sanguinaria.—An estimation of the total alkaloids of blood-root might be valuable, although such a determination possibly does not indicate the therapeutic value of the drug.

Scopola and Its Preparations.—All that is said in regard to belladonna applies to this drug also.

Sinapis.—An estimation of allyl-iso-thiocyanate can be recommended.

Stramonium and Its Preparations.—See modifications recommended under belladonna.

Strophanthus.—There is no reason why this potent drug should not be assayed. A reliable process has been worked out.

Veratrum.—An estimation of the total alkaloids has been recommended on various occasions.

In conclusion we wish to say again that we hope that in the U.S.P. IX such assay methods will be adopted which are easily carried out with the simplest apparatus, and in as short a time as possible, which, however, give at the same time reliable results, not theoretically accurate but practically accurate.

THE CULTIVATION OF MEDICINAL PLANTS AT THE COLLEGE OF PHARMACY OF THE UNIVERSITY OF MINNESOTA.[1]

By Edwin L. Newcomb, in Charge Department of Pharmacognosy.

The Medicinal Plant Garden of the College of Pharmacy of the University of Minnesota was designed primarily to facilitate and make more comprehensive the instruction in Pharmaceutical Botany and Pharmacognosy. It furnishes one of the essential means of giving instruction pertaining to the vegetable drugs or their preparations. The proper development of such a garden gives the student an excellent idea of the origin of vegetable drugs and not infrequently is the cause of the production of botanical enthusiasts, which all pharmacists should in reality be. The teaching of pharmaceutical botany and pharmacognosy without a medicinal plant garden is not comparable in efficiency with that supported by an adequate drug garden. With such an accessory the students are soon impressed with the distinguishing characters of such families of plants as the Compositæ, Solanaceæ, Umbelliferæ, etc., and they are quickly able to identify such plants as Digitalis purpurea, Verbascum thapsus, Inula helenium, Hyoscyamus niger, Atropa Belladonna, etc.

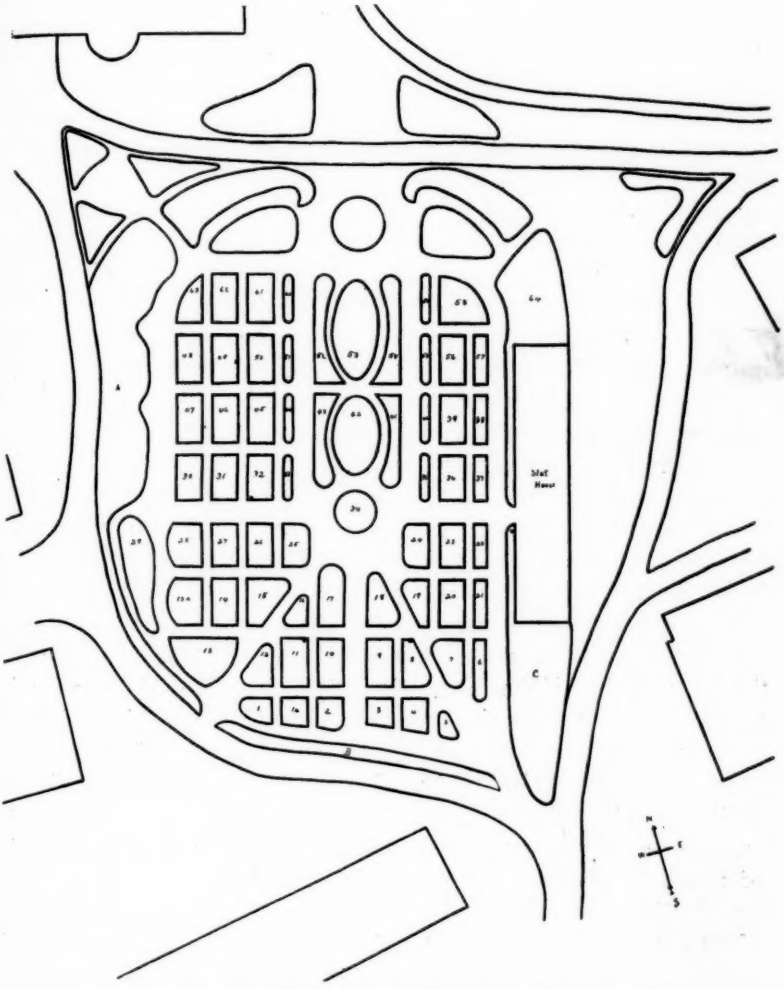
While it is true that the growing plant which ultimately yields the drug usually presents an entirely different appearance from the drug itself, this need not mitigate against or complicate the instruction. It rather facilitates it, for a thorough knowledge of the characters of the plant will insure a quick eye to identify the cured product or to detect inferiority in it, and the familiarity with the plants soon removes most trouble with nomenclature.

With the decided advantages which such facilities afford in giving instruction in pharmacy courses, it seems strange that so few colleges in this country have up to this time established independent medicinal plant gardens. A number of institutions are so situated that they have access to botanic gardens where many medicinal plants may be found growing. This association, good as it may be, does not meet the urgent need of a medicinal plant garden

[1] Read at the fifty-ninth annual meeting of the American Pharmaceutical Association, Boston, August 17, 1911.

in close proximity to and under the direct supervision of the college itself.

It is now nineteen years ago that Dean Wulling, realizing the



Plan of the Medicinal Plant Garden of the College of Pharmacy of the University of Minnesota.

need of such a garden, asked the Board of Regents of the University for a tract of ground and funds to establish medicinal plant cultivation. About fourteen years ago a plot of ground was granted, but no

funds were available and hence nothing apparent was accomplished at this time at the college, but Dean Wulling started a garden on a small scale at his home, which, however, he soon after abandoned principally because of lack of time and area. In the fall of 1910 an appropriation was secured for the establishing of a medicinal plant garden and late this spring the ground which had been granted some fourteen years ago was plowed for the College of Pharmacy and actual work begun.

The garden is admirably located and of about forty thousand square feet in area immediately adjoining the building occupied by the College of Pharmacy. It represents part of the University campus which some time ago was a shallow basin, but which has been filled in during the past few years. On this account the soil is quite varied, consisting mostly of light sandy loam with a coating of peat. The plot is surrounded on all sides by buildings which afford considerable protection. After the ground had been plowed and thoroughly harrowed, it was staked out into plots of convenient size and shape, for the most part 10 x 18 feet. A few beds of more ornamental design were prepared as the garden was to occupy a rather conspicuous location on the campus.

The question which has frequently been asked in connection with medicinal plant cultivation is, "Where can the seed or plants be obtained to make the start?" Many of our medicinal plants are used as ornamentals and hence American and European seed dealers are able to supply a certain amount of the desired seeds. In case the drug consists of the seed or fruit this, if not too old, may furnish a very valuable means of starting the work of propagation. Samples were taken from the drug collections at the College of Pharmacy of some fifty-eight different drugs and of these thirty germinated, giving in a short time a supply of plants yielding these drugs. This experiment disclosed a rather valuable test for the identification of certain seed drugs. A sample of Delphinium consolida on two germination tests showed the presence of ten per cent. of the seed of an entirely different plant. So close was the similarity of the two seeds that the adulterant would go undetected unless a microscopic examination was resorted to. The reason for the germination of only fifty per cent. of the various seeds tested was probably due to either or both of two causes: first, the age of the seed and second, injury to the vitality in preparation of the drug.

Among the seed taken from the drug collection which grew

and furnished strong plants may be mentioned those of Atropa belladonna, Delphinium consolida, Conium maculatum, Pimpinella anisum, Coriandrum Sativum and others from the Umbelliferæ Delphinium Staphisagria, Citrullus Colocynthis, Datura stramonium, Hyoscyamus niger and Lobelia inflate.

Seeds of the above plants and some fifty others were purchased from New York seed dealers and started in the greenhouse about February 17. Among the seed shown at this time were those of the following plants: Inula helenium, Capsicum spec., Arnica Montana, Glycyrrhiza glabra, Cytissus scoparius, Carthamus tinctoria, Lavandula spec., Passiflora incarnata, Matricaria Chamomilla, Coix lachryma, Datura metelloides, Rheum palmatum Ricinus spec., twelve varieties of Digitalis and many others.

Most of the seed germinated in from one to two weeks and the method of handling the seedlings being much the same in each case, a description is here given of Digitalis.

After carefully preparing the soil which was of good rich light moist loam containing a large amount of well-rotted sod and leaf mould, it was placed in four- or five-inch flower-pots supplied with a few pieces of broken pot for drainage. The soil should be lightly pressed down so that the surface is smooth and quite firm. The seed were then spread over this prepared surface and covered with the same soil, to which about forty per cent. of sand had been added. The seeded pots thus prepared were thoroughly watered with a rubber bulb sprinkler which does not wash the soil. Each pot was covered with a plate of window glass to retain the moisture. In the preparation of the soil it is important to select that which is as free from weed seeds as possible.

Digitalis lutea, Digitalis lanata, Digitalis grandiflora and Digitalis ferruginea gigantes required from thirteen to fifteen days to come up, while Digitalis purpurea rosea, Digitalis purpurea maculata superba, Digitalis purpurea gloxiniæflora alba, Digitalis purpurea monstrosa and Digitalis purpurea alba all germinated in from nine to thirteen days. In from two to three weeks the plantlets were well started, having one or two pairs of leaves. At this time they were transplanted into flats (shallow boxes about three inches deep and preferably eighteen by twenty-four inches in area). The same rich finely pulverized soil was used here as in the planting of the seed. The plants were put about two inches apart each kind in a separate flat and the soil firmly pressed about the roots. When

the plants became crowded in the flats they were transplanted into two and one-half or three-inch pots.

The next step was that of hardening off the plants before final planting. This was done by placing them outside in cold frames for the early part of May, glass being kept over them all the time for the first few days and then gradually withdrawn. The plots in the garden were worked over with a spading fork and the plants put in rows eighteen inches apart each way. About twelve hundred plants of the different species of Digitalis have been handled in the above described manner, the outside planting taking place from May 20 to June 20. The plants in the first beds put out have made a remarkable growth and the ground is covered with the beautiful rich green foliage.

In addition to the large number of plants started from seed, some plants were purchased, representing trees, shrubbery and hardy perennials from which drugs are obtained. The seed of over four hundred medicinal plants were imported and a large number of these are under cultivation, others are being put in as rapidly as the ground can be prepared.

A hedge of Rhamnus catharticus has been planted on the west and south sides of the garden. Within this are border beds filled with more or less tall growing annuals or perennials as Inula Helenium, Ricinus species, Hibiscus militaris, Borago officinalis, Atropa Belladonna, Martynia proboscidia, Datura Stramonium and Helianthus annus. At the north end the border widens out into a broad plot which is filled with Papaverum somniferum, Salvia officinalis, Nicotiana Tabacum, Salpiglossis, Canna, Thymus vulgaris, Lavandula vera and others. At intervals of twenty feet along the border such trees as Ulmus fulva, Xanthoxylum Americanum, Juglans nigra, Salix alba, Quercus alba, etc., have been planted. These outside beds are bordered with Digitalis spec., Cineraria maritima, Dianthus spec., Impatiens balsamina and Antirrhinum majus.

A large plot has been laid out at the south end of the slathouse and here may be found growing an interesting group of evergreens and other plants closely related botanically as Larix Europœa and Salisburia adiantifolia, the Japanese Ginkgo tree. Between the trees a collection of the plants which yield our common pot herbs have been temporarily located, including Ocimum Basilicum

Hyssopus officinalis, Melissa officinalis, Majoranum hortense, Origanum vulgare, Tanacetum vulgare, etc. Along the south side of the slathouse various varieties of Vitis vinifera have been put in to afford additional shade. Between these Citrullus Colocynthis was planted.

The slathouse, a structure one hundred feet long, twenty feet wide and seven and one-half feet high, extends along the east side. A collection of shade loving plants has already been obtained, including Cimicifuga racemosa, Podophyllum peltatum, Hydrastis canadensis, Geranium maculatum, Sanguinaria canadensis, Spigelia marilandica, Aspidium species, Cypripedium spec., and many others. A long bed is laid out along the front of the house and here different species of the following genera have been planted: Luffa, Momordica, Citrullus, Convolvulus, Bryonia, Cucurbita and Cucumis. In addition to these climbers, such perennials as Clematis, Humulus, Ampelopsis, Solanum, Wistaria, Aristolochia and Pueraria species are to be found. The entire length of the bed is bordered with Digitalis species and there is also a fine display of Cannabis gigantea, Cannabis american, Fœniculum vulgare and Zea Mays varieties.

The largest portion of the garden is laid out into the rectangular plots previously referred to. Of these the following are deserving of special mention:

Plot No. 4 is planted with Conium maculatum. This plant has done remarkably well. Several of the specimens now in blossom have attained a height of over four feet.

Plot No. 6 contains Ricinus communis var. minor and Ricinus communis var. major as well as a number of other species. The seed sold as drug often appears to be a mixture of seed from the different species of Ricinus.

Plots Nos. 8, 12, 13, 16, 28, 48, 49, 61 and 62 are filled with different varieties and species of Digitalis and it is hoped that some work can soon be done concerning the factors which influence the potency of the official drug.

Plot No. 14 contains Aconitum Napellus, A. Lycotonum and A. Fischerii, also Delphinium Staphisagria and other species of Delphinium.

In Plot No. 17 may be found capsicum frutescens and other species of capsicum.

Plot. No. 20.—Sinapis nigra and Sinapis alba.

Plot No. 24.—Coriandrum sativum, the drug purchased in the open market was used to plant this bed. The plants have made a fine growth and give promise of fruiting long before frost.

Calendula officinalis fills No. 25, a plant exceedingly easy of cultivation and producing a profuse number of flowers.

Plot No. 26 contains Matricaria Chamomilla. This bed is now a mass of the beautiful little white daisies and, like calendula, is very easy to grow.

In Plot No. 27 are twelve plants of Datura metelloides, which cover the entire 160 square feet devoted to them and present a magnificent sight in the evening when their large pure white odorous flowers expand.

Nicotiana repanda yielding Havana tobacco and N. Tabacum, yielding the so-called Pennsylvania and other commercial varieties of tobacco are growing luxuriantly in Plot. No. 30.

A fine group of Atropa belladonna seedlings is found in Plot No. 31, as well as a few flowering plants.

Plot No. 36 contains such Xerophytic plants as Aloe spec., Agave Americana, Cactus grandiflora and Euphrobia pilulifera, the border consisting of Echeveria spec.

Plots Nos. 39 and 56 are filled with such cereal yielding plants as Avena sativa, Hordeum sativum, Triticum sativum and Secale cereale.

Three varieties of Hyoscyamus are being studied, namely, H. niger, H. albus, and H. pictus.

Several plots throughout the garden were assigned to drug yielding shrubs. Some fifty of these have been planted, including Viburnum opulus and other species, Chionanthus Virginia, Hydrangea arborescens, Berberis vulgaris, Cornus stolonifera, Sambucus canadensis, S. nigra, S. pubens, Prunus serotina, Prunus Virginiana and Euonymus atropurpureus. Between the shrubs hardy perennials have been planted, such as Monarda species, Helenium autumnale, Iris spec., yielding Orris, Phlox spec., Pæonia officinalis, Yucca filamentosa, etc.

On five of the plots cold frames covered with sash were constructed. Many plants were started in these and they will be used again this fall for giving slight protection to certain plants during the winter.

Over one-half of the medicinal plants yielding official drugs are already under cultivation and more are being continually added.

Of those which do not yield official drugs the number is much larger and it is planned to add representative specimens as rapidly as possible of all drug yielding plants, some of which necessarily must be conserved in the greenhouse.

The general plan in developing the garden was to keep different species of plants belonging to the same family in beds of close proximity. This was followed out to a certain extent, but until soil conditions can be produced as desired in each plot the plan will not be entirely feasible. Such an association of plants greatly enhances the value of the garden in giving instruction in pharmaceutical botany.

The effect of different soils, moisture, etc., on the constituents of certain plants is to be carefully observed and it is hoped that some valuable pharmaco-physiologic work can soon be accomplished.

NEW ESSENTIAL OILS.[1]

Oil of Chamæcyparis Lawsoniana.—More than 20 years ago[2] we reported on the oil of the genus *Chamæcyparis* (N. O. Coniferæ), the sample then referred to being the product of *Chamæcyparis obtusa* Endl., a native of Japan. We are now in a position to describe the oil of a second species, *Chamæcyparis Lawsoniana* Parl. (*Cupressus Lawsoniana* A. Murr.), a stately coniferous tree, often found in German gardens. This oil was distilled by ourselves. The distilling material, which came from Holstein, yielded about 1 per cent. of a lemon-yellow oil of an odor reminding of oil of savin or of cypress. Its other properties were as follows: $d_{15°}$ 0,9308, $\alpha_D + 23° 48'$, $n_{D_{20°}}$ 1,48844, acid no. 3,7, ester no. 61,6, ester no. after acetylation 78,8, soluble in ½ its vol. of 90 per cent. alcohol, with 1 to 3 vols. passing turbidity. With bisulphite we succeeded in isolating small quantities of an aldehyde which, judging by its odor, was perhaps identical with laurinic aldehyde.

Camphor from Cinnamomum Glanduliferum.—R. S. Pearson, of Dehra Dun, has obtained from the leaves of *Cinnamomum glanduliferum*, a laurel-tree growing in the districts south of the Himalayas, a camphor which must probably be regarded as identical with the Japanese commercial product. A sample of the crude product, which has been sent to us by Mr. Pearson, possessed a m.p. of 175°, which was raised to 176° after recrystallization from dilute alcohol.

[1] From Semi-Annual Report of Schimmel & Co. (Fritzsche Brothers), October, 1910.

[2] Schimmel's Report, 1889.

The sp. rotation of the purified camphor in 55,55 per cent. alcoholic solution (90 per cent.) was $[\alpha]_D + 46,32°$; in a 43,91 per cent. solution of xylene $[\alpha]_D + 49,12°$, falling to $[\alpha]_D + 48,72°$ after the solution had been allowed to stand for 10 days. The oxime melted at 118° and, as was to be expected, rotated in the opposite direction, that is to say, to the left. When boiled with acetic anhydride no alcoholic constituent, such as borneol, could be detected; the crude product, therefore, consisted only of d-camphor.

Oil of Dacrydium Franklinii.—A distillate obtained from the wood of *Dacrydium Franklinii* Hook. f. (*D. huonense* A. Cunn.) has been sent to us from Melbourne, Victoria. The tree, which belongs to the Coniferæ, is known there as "Huon Tree." The oil was of a pale yellow color and had a pronounced odor of methyl eugenol, which, in fact, forms its principal constituent. $d_{15°}$ 1,0443; α_D + 0° 6′; $n_{D_{20°}}$ 1,53287; acid no. 0,9; ester no. 1,5; soluble in 5,2 vols. and more of 60 per cent. alcohol; the dilute solution showed a faint opalescence. In distilling, the greater part of the oil passed over between 251 and 253° [754 mm. (98 to 100° at 2 to 3 mm.)] and proved to be methyl eugenol, which was identified by conversion into veratric acid (m. p. 179 to 180). The oil also contains traces of eugenol (benzoyl compound, m. p. 70°). The methoxyl determination gave the high methyl value of 164,3, from which the methyl eugenol content was calculated as 97,5 per cent. but in reality it is probably a little less.

Oil of Eugenia Apiculata.—In Chili a drug known locally as "arrayan" is used in diarrhœa and in affections of the lungs, for which purposes it is said to enjoy a high repute among the natives. According to Tunmann[3] it consists of the young leaves, about 15 mm. long and 10 mm. broad, of a small tree of the family of the Myrtaceæ, *Eugenia apiculata* D. C. In addition to a glucoside-like tanning principle the leaves contain an essential oil, to which their medicinal virtues are specially attributed. We have worked up a parcel of these leaves, which yielded 1,27 per cent. of a brown oil, with an odor resembling that of oil of myrtle, and possessing the following constants: $d_{15°}$ 0,8920, α_D + 12° 40′, $n_{D_{20°}}$ 1,47821, acid no. 5,5, ester no. 25,8, ester no. after acetylation 65,3, soluble in 0,5 vol. and more of 90 per cent. alcohol, paraffin being separated out when the solution is diluted; the oil is not soluble in 10 vols. 80 per cent. alcohol.

Oil of Perilla Nankinensis.—*Perilla nankinensis* Decne. (*Perilla*

[3] *Pharm. Zentralb.*, 50 (1909), 887.

arguta Benth.; *Ocimum crispum* Thunb., N. O. Labiatæ), which is known in Japan as "*Shiso*" and of which the leaves are used as a vegetable and a spice, contains an essential oil of which we recently received a sample from Yokohama. The oil was mobile, pale-yellow to greenish, of a peculiar hay-like odor, and possessed the following constants: $d_{15°}$ 0,9265, α_D — 90°, $n_{D_{20°}}$ 1,49835, soluble in 0,3 vols. and more of 90 per cent. alcohol. It reacted both with acid and with neutral sodium bisulphite, 50 per cent. of an aldehyde being obtainable by this reaction. The odor of the aldehyde reminded somewhat of cuminic aldehyde, but in its properties it differed altogether from that body, as was evident, for example, from the fact that it reacted with neutral bisulphite of sodium. A sample was carefully purified from the sulphite compound and distilled first with steam and afterwards *in vacuo* under 4,5 mm. press. This sample was found to possess the following constants: b. p. 91° (4,5 mm.), 104° (9 mm.), 235 to 237° (750 mm.), $d_{20°}$ 0,9645, $d_{15°}$ 0,9685, α_D — 146°, $[\alpha]_D$ — 150,7°, $n_{D_{20°}}$ 1,50693. The oxime, which was also lævorotatory, melted at 102°, the phenylhydrazone at 107.5°. The aldehyde was oxidizable into the corresponding acid both by moist oxide of silver and with Beckmann's chromic acid solution.[4] It is almost insoluble in water but readily soluble in almost all organic solvents. Recrystallized from dilute alcohol it forms delicate white scales, m. p. 130°. So far, our attempts to elucidate the chemical constitution of the aldehyde have led to no result.

In connection with the above we wish to make a brief reference to an oil which is of special interest because it contains a dextrorotatory variety of the aldehyde described above. A sample of wood which was sent to us some time ago under the name of "spurious camphor wood" (*faux camphrier*), but to the botanical derivation of which we were unfortunately not able to obtain any clue, yielded upon distillation 2,06 per cent. of a pale yellow oil with an odor similar to that of the oil from *Perilla nankinensis* just referred to, $d_{15°}$ 0,9580; α_D + 98° 10′; $n_{D_{20°}}$ 1,49695; soluble in 2,5 vols. and more of 70 per cent. alcohol. The oil contained 75 per cent. of an aldehyde which reacted both with neutral and with acid sodium bisulphite, and otherwise agreed in every respect with the aldehyde contained in the oil of *Perilla nankinensis*, except that it rotated in the opposite direction. The properties of the aldehyde isolated with sodium bisulphite were as follows: b. p. 234 to 236° (743 mm.), 98 to 100° (7 mm.), $d_{15°}$ 0.9730, α_D + 137° 40′, $n_{D_{20°}}$ 1,50802. The

[4] *Liebig's Annalen*, 250 (1889), 325.

aldehyde was evidently not yet quite pure, which may explain the slight discrepancies between the two aldehydes. The oxime, like that of the first aldehyde, melted at 101 to 102°, the phenylhydrazone at 107 to 108°, an inactive mixture of the two aldehydes gave rise to derivatives showing the same melting points. The portions of the oil which did not react with bisulphite contained small proportions of cineol, which were isolated by means of the resorcinol compound.

Oil of Thymbra Spicata.—The labiate *Thymbra spicata* L., a native of Greece and Asia Minor, is a shrub-like plant closely allied to the genus *Thymus*. We have distilled some of this herb, which came from Smyrna, and obtained a yield of 1,5 per cent. of a yellowish oil with an odor reminding of thyme and origanum, and containing about 66 per cent. of carvacrol. The oil had the following constants: $d_{15°}$ 0,9460, α_D + 0, $n_{D_{20°}}$ 1,50675; soluble in 3,5 vols. of 70 per cent. alcohol.

Oil of Xanthoxylum Alatum.—From London we received under the name of "Chinese Wild Pepper" the fruit of *Xanthoxylum alatum Roxb.*, a shrub belonging to the Rutaceæ, which occurs in the mountains of Northern Bengal as well as in China. Upon distillation the fruit yielded 3,7 per cent. of a lemon-yellow oil with a peculiar odor, reminding of oil of water-fennel. Continued distillation yielded, in addition, 0,9 per cent. of a crystalline substance. We were compelled to abandon the attempt to dissolve this substance in the oil in the proportion indicated, because the bulk of the solid constituents again separated out even at a temperature of 25 to 30°. The properties of the oil and of the solid substance were therefore determined separately. The oil behaved as follows: $d_{15°}$ 0,8653, α_D — 23° 35′, $n_{D_{20°}}$ 1,48131, acid no. 9,9, ester no. 10,3, ester no. after acetyl. 33,6, soluble in 2,6 vols. and more of 90 per cent. alcohol. According to these analytical values the oil appears to consist chiefly of hydrocarbons, the nature of which remains to be elucidated by further investigation. The odor suggests the presence of phellandrene.

The solid substance which was obtained in the process of distillation, after being twice recrystallized from alcohol, presented colorless, odorless, optically inactive needles or leaflets, m. p. 83°. It was very readily soluble in ether, chloroform, and acetone, a little less readily in alcohol, benzene, and light petroleum (all three of which solvents are very suitable for recrystallizing the body), and

was insoluble in water. The substance is not an acid, it appears rather to be a phenol or lactone-like compound, as is evident from the fact that it does not react with solutions of alkaline carbonates, while it does react with those of caustic alkalies, from which latter it is again separated out by acidulation. Although when heated with benzoyl chloride it reacted violently, the yield of the resulting benzoyl compound was only slight, the greater part of the compound having remained intact. After repeated recrystallization from alcohol the benzoyl compound formed stout crystals, melting at 89°.

Dr. A. J. Ultée, of Salatiga, Java, has recently sent us two samples of essential oils which we desire to describe here only briefly, as a detailed publication concerning their composition has been promised by Dr. Ultée himself.

Oil of Alpinia Galanga Willd.—(N. O. Zingiberaceæ). This oil was of a lemon-yellow color and possessed a peculiar, strongly aromatic odor. Its constants were as follows: $d_{15°}$ 0,9847, α_D + 4° 20′, $n_{D_{20°}}$ 1,51638, acid no. 1,8, ester no. 145,6, soluble in its own vol. of 80 per cent. alcohol, opalescence ensuing upon the addition of 3 vols. According to Dr. Ultée, the oil contains pinene, cineol, camphor, and methyl cinnamate. The ester number of the oil indicates the presence of 42 per cent. methyl cinnamate.

Oil of Gastrochilus Pandurata Ridl.—(N. O. Zingiberaceæ). This oil was almost colorless; its odor strongly resembled those of estragon and basilicum oils. $d_{15°}$ 0,8746; α_D + 10° 24′; $n_{D_{20°}}$ 1,48957; acid no. 0; ester no. 17,3; imperfectly soluble in 10 vols. 80 per cent. alcohol, but making a clear mixture with 90 per cent. alcohol.

PHILADELPHIA COLLEGE OF PHARMACY—SEMI-ANNUAL MEETING.

The semi-annual meeting of the College was held September 25th, at 4 P.M., in the Library, the President, Howard B. French, presiding. Eighteen members were present. The minutes of the quarterly meeting held June 26th were read and approved. The minutes of the Board of Trustees for the meeting held June 6th were read by the Registrar, and approved.

The Committee appointed to draft suitable resolutions to the memory of Wallace Procter, reported by its Chairman, Professor

Joseph P. Remington, the following memorial, which was on motion adopted, and an engrossed copy directed to be sent to Mrs. Procter.

"WALLACE PROCTER.

The Philadelphia College of Pharmacy mourns the loss of one of her faithful sons, who as student, graduate, alumnus, member of the College, Board of Trustees, or Chairman of the Committee on Examinations, served the College faithfully for forty-two years. He departed this life May 27, 1911. No service was too arduous for him when he felt he could aid his Alma Mater. Skilled in the art and science of his profession he brought his talents to bear in the direction which seemed to him to be productive of good results to the institution. The Philadelphia College of Pharmacy places on record its highest sense of appreciation of the loving services of Wallace Procter."

The Committee on Nominations presented list of nominees for Trustees.

A communication was read from Mr. R. W. Cuthbert requesting his name be withdrawn from the list of nominees for Trustees.

The delegates to the American Pharmaceutical Association to the meeting held in Boston, August 14–18, reported verbally through Professor C. B. Lowe. A number of items of interest were related in addition to the extended report of the meeting published in the AMERICAN JOURNAL OF PHARMACY, page 436, in the September number.

Amendment to By-laws: The amendment to Article XI, Section I, of the By-laws of the College, laid over from the previous meeting, was taken up, and on motion adopted. The amended section reads as follows: The pharmaceutical meetings of the College shall be held for the purpose of discussing scientific questions and subjects relating to trade interests once in every month, from October until May, both inclusive, at such times as the Committee on Pharmaceutical Meetings may determine. This amendment will enable the Committee to name a time that will enable a larger number of the members and students to be present.

The President appointed the following as the Committee on Membership: Charles H. LaWall, Chairman; E. M. Boring, Richard H. Lackey, Richard M. Shoemaker, C. A. Weidemann.

Election of Honorary Members: The names of those proposed for Honorary Members at the June meeting, and laid over for action till the September meeting, were then read. Mr. J. W. England was appointed teller, who, after a ballot was taken, reported the unani-

mous election of Professor Oscar Oldberg, who retires as Dean of the School of Pharmacy of the Northwestern University of Illinois, after having completed twenty-five years of service in educational work and to the general uplift of pharmacy, and of Professor Edgar F. Smith, Professor of Chemistry at the University of Pennsylvania and now Provost of that institution, distinguished for his studies in electro-chemistry and author of very many scientific and educational papers.

The President announced the death of Dr. George R. Vernon, on September 16, 1911, a graduate of the class of 1871 and a member of the College since 1872.

Election of Trustees: The list of nominees was read. C. Stanley French and Mitchell Bernstein were appointed tellers, who, after a ballot was taken, reported the election of George M. Beringer, Joseph W. England and C. Mahlon Kline, whereupon the President declared them elected to the Board of Trustees for the ensuing three years.

C. A. WEIDEMANN, M.D.,
Recording Secretary.

ABSTRACTS FROM THE MINUTES OF THE BOARD OF TRUSTEES

June 6—Sixteen members were present. Committee on Property—reported estimates for repairing and also replacing the water tank on the roof of the building, and stated that the tank builders thought the condition of the present tank was such that it would be much better to replace it than to make repairs; and the Committee further suggested the advisability of increasing the capacity to 8000 gallons provided the supports would admit of it. The Committee was empowered to proceed with the work as in their judgment was best.

The Committee on Library reported the receipt of the first installment of the Encyclopedia Brittanica. Several books had been donated by Professor Remington. Ninety-four books were accessioned, classified and shelf-listed, making a total of seventeen hundred and fifty-seven books ready for the shelves. Seventy-five persons consulted the Library during May.

The Committee on Examinations referred to the form now used for special certificates, objection was had to the present form as it looked so much like a Diploma. After discussion a Committee

consisting of Howard B. French, W. L. Cliffe and Professor Joseph P. Remington was appointed to consider the matter.

The Committee on Commencement reported all the exercises attending Commencement had passed off nicely, and it was moved that a resolution of thanks be tendered the Speaker and Minister officiating. So ordered. The Committee reported that the Commencement in 1912 would take place on Thursday, May 23rd, at the Academy of Music, which would be engaged for the occasion.

The Treasurer was authorized to pay the salary lists during the summer of the Board, and such other bills as were approved by the Committee on Accounts and Audits.

(Signed) C. A. WEIDEMANN,
Secretary.

PHARMACEUTICAL MEETINGS.

The pharmaceutical meetings of the Philadelphia College of Pharmacy have been held for many years on the third Tuesday of the month from October to May. The section in the article of the by-laws of the college, relating to the date of these meetings, has been changed (see account of the September meeting of the college given elsewhere in this issue), leaving it optional with the committee to fix the date of each meeting. The first meeting was held on Monday, October 16th, at 3 P.M., Mr. William L. Cliffe acting as chairman.

Mr. George M. Beringer presented a communication upon "The Pharmacists' Plea for a Rational Pharmacopœia" and Mr. Otto Raubenheimer, of Brooklyn, spoke upon "The List of Proposed Deletions" of the new U. S. Pharmacopœia. Both speakers referred to a number of substances which they considered should be included in the new Pharmacopœia as in some cases the preparations of the drugs were retained. Professor Remington, chairman of the Committee of Revision of the U. S. Pharmacopœia, stated that in some instances the omissions were due to mere oversight and that nearly all of the substances referred to were being further considered either with regard to their inclusion or deletion in the forthcoming Pharmacopœia. He also emphasized the importance of abiding by the majority vote as it is impracticable to do otherwise.

The discussion was also participated in by Dr. Lowe, Mr. H.

P. Busch, Dr. H. C. Wood, Jr., and Professor Kraemer. Dr. Lowe referred to a few of the drugs which are to be retained and which he thought were too seldom used to merit a place in the pharmacopœia. Mr. Busch said that the pharmacopœia is no longer a theoretical standard but should be a book of practical standards for commercial use. Dr. Wood especially called attention to the large amount of work which had been done by the Sub-committee on Scope of the Pharmacopœia in arriving at its conclusions as presented in the tentative report already published. Professor Kraemer emphasized the desirability of deleting obsolete substances and their preparations and said that the work in connection with the deletions and additions of the pharmacopœia is of necessity a compromise and that the work thus far in his opinion had been well done.

President French sent several interesting specimens for the museum. Among these were some Chinese tung nuts from which China oil is made; specimens of China wood oil and soya bean oil; and four large photographs showing Chinese coolies handling "wood oil" in Hankow, China. The specimens and photographs were given President French by L. C. Gillespie & Sons, whose office is located in Hankow, China. Mr. French also sent a bottle of camphorated spirits which was made and put up by A. S. Watson & Co., Hong Kong, China. Prof. Charles H. LaWall made a polariscopic examination of the specimen and found it to contain 10 per cent., or a normal amount of camphor, for this preparation, and the identity tests showed that the camphor is of natural and not of synthetic derivation.

Professor Samuel P. Sadtler presented a specimen of mangrove bark which assayed 46.05 per cent. of tannin.

Messrs. Parke Davis & Co. presented to the college a large photograph in colors of medicinal plank, the drugs derived from which are standardized by chemical or physiological means. They also sent for distribution to the members present, a booklet giving valuable information on those drugs which are standardized by chemical or physiological means and also illustrated with handsome photographs in colors of the plants from which they are derived.

Professor Kraemer exhibited a large gourd containing Barbadoes aloes which he had recently purchased for the college. He stated that from the information that he had thus far received the aloes industry had been resumed in Barbadoes during the past few years and that the annual crop is said to be about 1500 pounds.

H. K.

NEW YORK GERMAN APOTHECARIES' SOCIETY.

The New Yorker Deutscher-Apotheker-Verein, the oldest pharmaceutical association in the United States, celebrated the sixtieth anniversary of that society on September 28th with a great Kommers in the banquet hall of Terrace Garden, New York City. It is now sixty years since Messrs. Ramsperger, Waldorf, Gnadendorf, Hasse and Rudolfi came together in Zocke's restaurant and determined to meet regularly and to enjoy the German "Gemütlichkeit" for which each one was yearning. They elected Mr. Gustav Ramsperger the first President, and it was indeed a thrilling occasion to have him as the sole survivor of the old guard, present to recite the history of this organization from the time of its humble beginnings, until to-day it is one of the strongest and most influential organizations in America.

These pioneers of the early organization met together late at night, after their stores were closed, not only to think of the Fatherland and the ties across the sea, but to become the most intense and virile of Americans. During these hours of relaxation and enjoyment they were thinking of the advancement of their business and profession. Each one possessed a vigorous intellect and was dominated by a high ethical standard. And as they drank from their steins of beer and smoked their cigars, they discoursed on "the doings of the day," the humorous incidents in the store, and the difficulties of the prescription counter. They furthermore read original poems and sang original songs. Some of them under the chairmanship of Mr. Weissmann started a pharmaceutical museum. Here were gathered together the galenical preparations obtained from different apothecaries and which demonstrated the necessity for uniformity of processes. In fact, it was this work which suggested the National Formulary. In the early days there were but twenty-two members and as they came to know each other better, the ties became so strong and the loyalty to the Verein so great that the association must be perpetuated and they enrolled members of German descent, until to-day there are several hundred members.

Dr. William C. Alpers, one of the best known and most esteemed of American pharmacists, acted as toastmaster. He was overflowing with enthusiasm and good humor and conducted the Kommers in the true spirit of the Verein. Mr. Carl F. Schleussner, an ex-president of the Verein, presented to Mr. Ramsperger a loving-cup on the

occasion. The anniversary was marked by the presence of Dr. Abraham Jacobi, president of the American Medical Association, Prof. Joseph P. Remington and Prof. John Uri Lloyd, all three of whom were made honorary members. The address of Dr. Alpers, upon giving the diplomas to Prof. Remington and Prof. Lloyd, echoes so much of the sentiment of the society that it is here given in its entirety. It is as follows:

"The pleasing and cheerful words that you have just addressed to us have gone to our hearts, and come back from there like a joyous and responsive echo. It is not often that we have Americans prominent in pharmacy as you two, among us. Our society is a German one, and the official language here is the German tongue. We watch over German features and are proud of them not because we dislike the English language, nor because we think less of things American. Our daily surroundings, our aspirations, our hopes in business, as in social matters, in fact, all our daily activities are American, and we are Americans in every sense of the word. Indeed, no one may become a member of this society unless he is a citizen of the United States.

"If yet we cling to German customs, we do so because our meetings are a refuge from our daily toil. Here we come back to the days of our youth, here we find that recreation that is needful to us, here we once more revel in those ideals which fill so completely the heart of the German youth: and we believe this change in language, this change in thought, this return to days long past, and never to be recalled, gives us strength and encouragement, and in the enjoyment of German 'Gemütlichkeit' we find ample recompense for our daily duties. And more than this, the intercourse between German and American civilization has increased from day to day during the last few decades.

"We have prized it here for sixty years and we are proud that the spirit that has kept this society alive and made it grand and given it influence and importance, has added greatly in bringing together the scientific bodies of the two great nations. To us Germans, our new country is our bride, for whose life and honor we are ready to sacrifice all we have, but in our loyalty and affection for her we will never forget our loving mother across the sea, and always have ready for her a resting place at our hearth.

"It is in this feeling of pleasure and pride that we welcome you to-night in our midst, you whom we believe to be the two most typi-

cal representatives of American pharmacy. You both have risen from the low position as apprentice in a drug store to high places in our profession. You, Joseph P. Remington, as chairman of the Committee of the Revision of the Pharmacopœia, have attained what I consider the highest honor that American pharmacy can confer. And you, John Uri Lloyd, have gained an international reputation as scientist and author, and in commercial pursuits have not forgotten the sweeter and gentler side of human nature, and depicted them in a masterful way in your beautiful novels.

"It is therefore in this spirit of pride and friendship, which goes out from us to you, that we have decided to confer upon you both the honorary membership of the German Apothecary Society. We want to emphasize herewith our loyalty for American pharmacy and our admiration for American science. We want to have it understood that we are American in heart and soul, and further, we want to give expression to our personal admiration and love with which our hearts go forth to you as the best men that American pharmacy has produced. And finally, speaking in a broader sense, we wish to accentuate the bonds of friendship that exist among scientific men of the two nations, Germany and the United States, that broad and noble friendship which alone makes for higher civilization, for better knowledge, for better understanding of all that is grand and ennobling in either country and that brings the two great nations closer and closer together in a common purpose. It is in this spirit that I hand you these diplomas, and I know that you will accept them in the same way."

Addresses were also made by Mr. Felix Hirseman, an ex-president of the Verein, who reviewed the history of pharmacy in New York during the past 60 years; Mr. Carl Hauser, the well-known humorist, had for his theme, "Sixty Years as the Customer of the Apothecary." The newly-elected honorary members also were called upon to respond.

The programme was gotten up in pamphlet form, containing songs written for the occasion and excellent caricatures of some of the members and guests. The officers of the New Yorker Deutscher-Apotheker-Verein at present are: president, George Klinan; honorary president, Gustav Ramsperger; vice-presidents, Dr. C. F. Klippert and Paul F. Gebicke; permanent secretary, Otto P. Gilbert; corresponding secretary, E. A. Boetzel; treasurer, Robert S. Lehman; recorder, George Leinecker; librarian, George C. P. Stolzen-

burg; board of directors, E. C. Goetting, C. F. Schleussner and Felix Hirseman. Otto P. Gilbert was chairman of the Jubilee Committee, which deserves much credit for the excellent programme and menu, the selection of speakers and the entertainment provided.

H. K.

UNIVERSITY OF THE PHILIPPINES.

Course in Pharmacy.

The Board of Regents of the University of the Philippines, on January 12, 1911, decided to establish a course in pharmacy, in the College of Liberal Arts. Students will be admitted to the first year of the course at the opening of the school year 1911–1912.

The course in pharmacy will require three full years of study, and will lead to the degree of Graduate in Pharmacy. A fourth year will be offered leading to the degree of Pharmaceutical Chemist.

The entrance requirements for the course in pharmacy are those for entrance to the College of Liberal Arts.

No students will at present be admitted to the course in pharmacy with advanced standing; nor will any work of the course beyond the first year be given during the school year 1911–1912.

The second year of the course in pharmacy will be opened in 1912; the third year in 1913.

Students will register for the course in pharmacy with the dean of the College of Liberal Arts.

CORRESPONDENCE.

Physiological Methods for the Standardization of Digitalis.

Editor of the American Journal of Pharmacy,
Philadelphia, Pa.

Dear Sir:

In a paper of mine which you were good enough to publish ("Physiological Methods for the Standardization of Digitalis," Am. Jour. of Pharm., May, 1911) I made the statement that Dr. Houghton advocated the use of ouabain as a standard preparation in testing the members of the digitalis group on frogs. I have since learned that Dr. Houghton employs crystalline Kombé strophanthin, believing it superior to the Gratus strophanthin. If you would be so kind as to publish this correction, I should be very much obliged.

Very truly yours,

May 26, 1911. Chas. C. Haskell.

National Formulary.

To the Editors of Pharmaceutical Journals and the Secretaries of Local Branches of the American Pharmaceutical Association:

I am sending you herewith, for general discussion, an installment of formulas that it is proposed to add to the National Formulary, and trust that you will be willing to bring them to the attention of members of the American Pharmaceutical Association and other pharmacists and druggists who may be interested.

The object of giving publicity to proposed changes and additions is to elicit, if possible, comment and criticism before the final publication of the Fourth Edition of the National Formulary so as to avoid, as much as possible, untoward criticism of the book after its promulgation as a national standard.

If editors of pharmaceutical journals will give publicity to the material as offered and if secretaries of local branches of the American Pharmaceutical Association will offer this material for experimentation and discussion there will be no danger of incorporating into the forthcoming edition of the National Formulary formulas that have not been thoroughly tried in the different sections of the country under varying conditions.

In this connection it should be remembered that failure to criticize any or all of these formulas must be taken as a tacit acquiescence and will necessarily lead members of the Committee on National Formulary to infer that the formulas as offered are acceptable.

Trusting that you will be willing to co-operate in the work of perfecting the National Formulary, I am

Fraternally yours,

M. I. Wilbert.

The following are some of the new formulas that have been suggested for inclusion in the forthcoming edition of the National Formulary. The committee is desirous of having them thoroughly tried by pharmacists in different sections of the country so as to avoid, as much as possible, unfavorable comment after the final publication of the book. Comments and criticisms, based on practical experiences, will be welcome. All communications should be

addressed to the Chairman of the Committee, Prof. C. Lewis Diehl, 932 Cherokee Road, Louisville, Ky., who will submit the comments to the sub-committee having the matter in charge.

ELIXIR AMYGDALÆ COMPOSITUM.

(Compound Elixir of Almond.)

Oil of bitter almond	0.5 c.c.
Vanillin	1.0 Gm.
Stronger orange flower water	150.0 c.c.
Alcohol	50.0 c.c.
Syrup	400.0 c.c.
Kieselguhr	10.0 Gm.
Distilled water, a sufficient quantity to make	1000.0 c.c.

Dissolve the oil of bitter almond and the vanillin in the alcohol, add the syrup, and then the stronger orange flower water, then the distilled water in several portions, shaking the mixture thoroughly after each addition; then add the kieselguhr, mix and filter, returning the first portion of the filtrate, if necessary, until it runs through clear. Lastly, wash the filter with sufficient of a mixture of alcohol 1 volume and distilled water 19 volumes, until 1000 c.c. of product is obtained.

ELIXIR GLYCYRRHIZÆ AQUOSUM.

(Aqueous Elixir of Glycyrrhiza. Aqueous Elixir of Licorice.)

Fluidextract of glycyrrhiza	150 c.c.
Compound spirit of cardamom	5 c.c.
Stronger orange flower water	200 c.c.
Glycerin	150 c.c.
Syrup	150 c.c.
Water, a sufficient quantity to make	1000 c.c.

Mix and filter.

ELIXIR RUBRUM.

(Red Elixir.)

Cudbear	2 Gm.
Aromatic elixir	1000 c.c.

Add the cudbear to the aromatic elixir, in a suitable container, and allow the mixture to stand for six hours with occasional agitation, then filter.

ELIXIR TRĪUM BROMIDORUM.

(Elixir of Three Bromides.)

Ammonium bromide	80 Gm.
Potassium bromide	80 Gm.
Sodium bromide	80 Gm.
Cudbear	2 Gm.
Compound elixir of almond, a sufficient quantity to make	1000 c.c.

Dissolve the bromides in sufficient compound elixir of almond, add the cudbear and allow the mixture to macerate in a closely stoppered bottle for six hours, with occasional shaking. Finally filter.

ELIXIR FORMATUM.

(Elixir of Formates.)

Potassium formate	50 Gm.
Sodium formate	50 Gm.
Aromatic elixir, a sufficient quantity to make	1000 c.c.

Dissolve the formates in the aromatic elixir and filter.

ELIXIR FORMATUM COMPOSITUM.

(Compound Elixir of Formates.)

Monohydrated sodium carbonate	23 Gm.
Magnesium carbonate	20 Gm.
Strontium carbonate	25 Gm.
Lithium carbonate	8 Gm.
Quinine alkaloid	7.7 Gm.
Formic acid	200 c.c.
Compound spirit of cardamom	10 c.c.
Acetic ether	2 c.c.
Alcohol	100 c.c.
Glycerin	300 c.c.
Purified talc	20 Gm.
Distilled water, a sufficient quantity to make	1000 c.c.

Add the formic acid to 300 c.c. of distilled water and in this dissolve the carbonates, and then add the quinine; to this solution add the glycerin and then the alcohol, previously mixed with the compound spirit of cardamom and the acetic ether, agitate thoroughly, and add sufficient distilled water to make the product measure 1000 c.c. Then add the purified talc, mix and filter with sufficient mixture of alcohol 1 volume, distilled water 9 volumes, until 1000 c.c. of finished preparation is obtained.

ELIXIR CARDAMOMI COMPOSITUM.

(Compound Elixir of Cardamom.)

Compound spirit of cardamom	10 c.c.
Alcohol	90 c.c.
Syrup	400 c.c.
Kieselguhr	10 Gm.
Distilled water, a sufficient quantity to make	1000 c.c.

Mix the compound spirit of cardamom with the alcohol, add the syrup, and then the distilled water in several portions, shaking the mixture thoroughly after each addition; then add the kieselguhr, mix and filter, returning the first portion of the filtrate, if necessary, till it runs through clear. Lastly, wash the filter with sufficient of a mixture of alcohol 1 volume and distilled water 9 volumes, until 1000 c.c. of product is obtained.

SPIRITUS CARDAMOMI COMPOSITUS.

(Compound Spirit of Cardamom.)

Oil of cardamom	20.0 c.c.
Oil of orange	20.0 c.c.
Oil of cassia	2.0 c.c.
Oil of cloves	1.0 c.c.
Anethol	1.0 c.c.
Oil of caraway	0.1 c.c.
Alcohol, a sufficient quantity to make	200 c.c.

Mix the oils with 140 c.c. of alcohol, finally adding a sufficient quantity of alcohol to make the spirit measure 200 c.c.

ELIXIR VANILLINI COMPOSITUM.

(Compound Elixir of Vanillin.)

Compound spirit of vanillin	20 c.c.
Alcohol	80 c.c.
Glycerin	25 c.c.
Syrup	300 c.c.
Kisselguhr	10 Gm.
Tincture of caramel	20 c.c.
Distilled water, a sufficient quantity to make	1000 c.c.

Mix the compound spirit of vanillin with the alcohol, add the glycerin, and then syrup and distilled water in several portions, shaking the mixture thoroughly after each addition; then add the kieselguhr, mix and filter, returning the first portion of the filtrate, if necessary, till it runs through clear. Lastly, wash the filter with a mixture of alcohol 1 volume and distilled water 9 volumes, until 980 c.c. of product is obtained. Finally, add 20 c.c. of tincture of caramel.

SPIRITUS VANILLINI COMPOSITUS.

(Compound Spirit of Vanillin.)

Vanillin	40 Gm.
Oil of orange	10 c.c.
Oil of cardamom	2 c.c.
Oil of cassia	1 c.c.
Alcohol, a sufficient quantity to make	200 c.c.

Dissolve the vanillin and the essential oils in 150 c.c. of alcohol and then add sufficient alcohol to obtain 200 c.c. of product. Store in tightly stoppered amber-colored vials, in a cool place, protected from light.

ELIXIR AURANTII AMARI.

(Elixir of Bitter Orange. Elixir of Curacao.)

Oil of bitter orange	4 c.c.
Tincture of bitter orange peel	20 c.c.
Alcohol	300 c.c.
Stronger orange flower water	20 c.c.
Syrup	400 c.c.
Kieselguhr	10 Gm.
Distilled water, a sufficient quantity to make	1000 c.c.

Mix the oil of bitter orange and the tincture of bitter orange peel with the alcohol, add the syrup, and then the stronger orange flower water, and then the distilled water, in several portions, shaking the mixture thoroughly after each addition; then add the kieselguhr, mix and filter, returning the first portion of the filtrate, if necessary, till it comes through clear. Lastly, wash the filter with sufficient of a mixture of alcohol 3 volumes and distilled water 7 volumes, until 1000 c.c. of product is obtained.

ELIXIR SODII SALICYLATES COMPOSITUM.

(Compound Elixir of Sodium Salicylate.)

Sodium salicylate	80 Gm.
Fluidextract of cimicifuga	32 c.c.
Fluidextract of gelsemium	16 c.c.
Potassium iodide	16 Gm.
Purified talc	15 Gm.
Aromatic elixir, a sufficient quantity to make	1000 c.c.

Dissolve the sodium salicylate and potassium iodide in 800 c.c. of aromatic elixir, add the fluidextracts and then sufficient aromatic elixir to make 1000 c.c. Add the purified talc, mix and filter.

Compound elixir of sodium salicylate should be kept in amber-colored bottles, protected from the light.